MULTIFUNCTION EXERCISE DEVICE

FIELD OF THE INVENTION

The present invention generally relates to devices for performing physical exercise. More specifically, the present invention relates to space efficient exercise devices that are capable of multiple exercise function.

BACKGROUND OF THE INVENTION

As our society becomes more technologically advanced, our bodies are faced with fewer physical demands. To maintain a healthy lifestyle, our physical bodies require stress in the form of resistance training and cardiovascular training. In the interest of efficiency, products have been created for the intended purpose of use in the home. This accommodates busy lifestyles in that the user can save travel time to a health club or gym by exercising at home. Since most homes are not made to include a gym, space is of a premium. Therefore, devices that provide a multitude of exercises in a single unit and are able to fold away for storage when not in use are greatly desirable. Spring resistance can be advantageous when used on such a device because weight plates, which are heavy to move and inexpensive to ship can be replaced with this lightweight mode of energy storage. The larger muscles of the body, such as the hip and leg extensors are preferably utilized on such a piece of home exercise equipment. Doing so not only allows strength training of these valuable muscle groups, but at low resistance the repeated movement for a prolonged period of time (over 15 minutes) can provide a very effective form of cardiovascular exercise.

SUMMARY OF THE INVENTION

In one aspect, of the invention features an exercise device including a frame, and a base

adapted for linear motion and supported by the frame. A multi-position lock is mounted to the frame, the lock enabling a plurality of secure angular orientations relative to the frame. A bar is adapted to couple to the multi-position lock and a head portion is pivotally mounted to the frame. The frame includes a spring that is releasably coupled to the frame thereby, when engaged the spring allows resistance to movement of the head portion.

The system may also include the frame and the base being adapted for linear motion by use of, in combination, a male tube and a female tube that telescope relative to one another. The multi-position lock may be comprised of a first portion that is releasably secured to a second portion, the first portion mounted to the frame and the second portion adapted to receive the bar.

The bar is preferably further comprised of a free end, a handle and a flexible portion. The flexible portion is preferably comprised of a coil spring that is mounted between the free end and the handle.

The head portion preferably includes a head frame mounted to a head support and the head frame is mounted to the spring. The spring may be comprised of a torsion spring that is releasably coupled to the frame by way of a locking pin and a spring ear. This can be accomplished by the locking pin being movably mounted to the frame and the spring ear being mounted to the spring. The base may also include at least one wheel capable of articulation on a supportive surface.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects of this invention, the various features thereof, as well as the invention itself, may be more fully understood from the following description, when read together with the accompanying drawings, as described:

Fig. 1 is an isometric view of an assembled multifunction exercise device produced in accordance with the present invention.

Fig. 2 is an exploded isometric view of a multifunction exercise device produced in accordance with the present invention.

Fig. 3 is a side view of an assembled multifunction exercise device in a single position, the device produced in accordance with the present invention.

Fig. 4 is a side view of an assembled multifunction exercise device showing multiple starting positions of the back and bar, the device produced in accordance with the present invention.

Fig. 5 is a side view of an assembled multifunction exercise device shown as it could be used, the device produced in accordance with the present invention.

For the most part, and as will be apparent when referring to the figures, when an item is used unchanged in more than one figure, it is identified by the same alphanumeric reference indicator in all figures.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention is an exercise device that includes multiple components that are adjustable to provide a great variety of exercise variation in a single unit. In **Fig. 1**, the device **10** includes a base **12** that provides linear movement relative to the frame **14**. This can be accomplished in a variety of ways but the most cost efficient is by use of telescoping tubes, in this case a female tube **16** as part of the frame **14** and a male tube **18** as part of the base **12**. Variation to these elements and specifics of the components are not considered critical to the

novelty of the invention and therefore variations can exist. The given combination allows linear movement and tracking of the base **12** relative to the frame **14** with minimal number of parts.

Resistance to movement of the base **12** relative to the frame **14** can be provided by tensions cords **20**. These cords **20** can vary in individual tension and number of cords used. Only two cords **20** are shown in this figure, but there could be as many as six in that the cords are suspended between the base hooks **22** and the frame hooks **24**. In the preferred embodiment there are six base hooks **22** and six frame hooks **24**, but this number can vary as needed to supply more tension or to limit the tension capability of the device **10**.

The base **12** is shown here to include a handle **26**. This can be used to support the feet of a user or the hands of a user, depending upon the orientation of the user relative to the device **10**. A pair of wheels **28** are also mounted to the base **12**. This allows the base **12** to move over a supportive surface with minimal drag or friction. Friction in a piece of exercise equipment is in many cases undesirable. Friction causes wear, which prematurely shortens the useful life of the device. More importantly, friction is a non-conserved energy. This means that the user's force production during the concentric phase (muscle shortening) of movement is the resistance plus the friction. During the eccentric phase (muscle lengthening) of movement the resistance the user feels is the resistance applied by the device minus the force of friction. The muscles of the body are always stronger during the eccentric phase as compared to the concentric phase; therefore a device with excessive friction exacerbates this inherent difference and thereby reduces the effectiveness of the exercise device. Therefore friction reducing elements such as rolling friction wheels and simplistic guidance and tracking systems can be desirable.

The frame includes a pair of movable locks **30**. These locks **30** can be released and

engaged by articulating the lock tab **32**. When released, the holes **34** can be rotated to different angular orientations, as depicted by the arrow **36**. A bar **38**, which includes free ends that are received by the holes **34** in the locks **30** are then capable of being positioned in an infinite number of angular orientations relative to the frame **14**. The locks **30** are intended to set the starting position of the bar **38** in this, the preferred embodiment. A pair of springs **40** are included in the structure of the bar **38**. The bar post **42** does not extend through the spring **40**, thus allowing a front to rear resistance to movement of force applied to the bar handle **44** by flexion of the spring **40** that is then countered by the frame **14** by way of the locks **30**. This movement is illustrated by the front arrow **46** and rear arrow **48**. A seat pad **50** is positioned adjacent to the locks **30** to aid in supporting the user during operation of the device **10**.

Another unique feature of the invention **10** is found in the head portion **52**. The head portion **52** includes a head frame **54** that supports a head support **56**. This frame **54** is a structural member that, in the preferred embodiment, is a piece of steel tubing, but is not limited to any particular material or form. The structural integrity of the frame **54** is evident not only in its ability to support the head support **56**, but a torsion spring **58** is attached to each side of the support **54**. The springs **58** are attached to spring ears **60** which are releasably engaged with the pin **62**. The spring **58** is generally supported by a mandrel that is mounted to the head ears **64** by way of a hole **66**. This allows the spring **58** and entire head portion **52** to be pivotally mounted to the frame **14**. By engaging the spring ears **60** with the pin **62**, the torsion springs **58** offer resistance to movement of the head portion **52** by the user. Movement of the head portion **52** is depicted by the arrow **68**. The head portion **52** would typically go through such a movement to engage the ears **60** with the pins **62**.

It is to be understood that the use of the term "torsion spring" applies to any spring that is capable of applying a torsional load. This can be an extension spring, a leaf spring or any other form that can provide torsional bias between the head frame **54** and the head ears **60**. The term "torsion spring" is intended to be descriptive and not limiting to the scope of the invention.

In **Fig. 2**, the seat pad **50** and the bar **38** have been removed to better show the detail of the device **10**. The bar **38** includes a pair of free ends **70** which are received by the holes **34**. There are a variety of methods of attachment of these parts together, but the inventor has found that simple friction between the mating parts is sufficient to hold the bar **38** in the locks **30** due to the orthogonal forces that are inherently applied during the front to rear flexion during the exercises. If an additional clamping force was needed, the free ends **70** could be fitted with a contour or ridge that is received by the internal structure of the lock **30**. The lock **30** could also be fitted with a friction lock that not only locks to the frame **14**, but clamps down on the free end **70** of the bar **38** through manipulation of the lock tab **32**. Frame ears **72** can be used to support the seat pad **50**, but are not critical to the novelty of the invention. Any of a variety of forms of attachment can be used as long as it does not interfere with the tracking of the base **12** with the frame **14**.

A side view of the device **10** is shown in **Fig. 3**. Here the unit is in a fully extended position with the bar **38** set perpendicular to the frame **14** by virtue of the lock **30**. The spring ears **60** are disengaged from the pin **62**. The base **12** is retracted within the frame **14** by the tension applied from the tension cords **20**. The device **10** is set in one position that is ready for a user to perform a variety of exercises.

A variation of the previous is shown in **Fig. 4**. Here the bar **38** is shown in a vertical

position, in a position rotated forward **74** and one rotated to the rear **76**. It is to be noted that the springs **40** on the bars **38** are not deformed, therefore the displacement of the bar **38** to the various positions is done by movement of the lock **30**, not through movement during the exercise. The head portion is also shown in two positions. The dashed line shows the head portion **52** in a down position similar to if the torsion spring (as disclosed previously) were disengaged from the frame. In the upper position (solid lines) the head portion is almost vertical. The weight of the head portion **52** will cause some deformation of the torsion spring and would naturally position the head portion **52** in a position similar to that shown. The lower position (dashed lines) would be achieved by the user pushing against the head portion **38** to displace it to this lower position against the tension of the torsion spring. This is further illustrated in the following figure.

A sample exercise is shown in **Fig. 5**. This is only one example of a virtually endless list of exercises that can be performed on the device **10**. It is understood that this is only one example of the versatility of device **10**. The user **78** is positioned supine on the device **10** with feet **80** against the base **12**, lower torso **82** on the seat pad **50** and head **84** and shoulders on the head support **56** of the head portion **52**. With the spring ear **60** locked to the frame, the head portion **56** offers resistance to movement down as depicted by the down arrow **86**. The upward movement of the upper body of the user **78**, as depicted by the up arrow **88**, is either assisted by the torsion spring or completely provided by the torsion of that spring, depending upon the tension of the spring used. If the tension is great enough, the user will push the head portion **56** down and the spring will push the user up again. If the spring provides less tension, the weight of the upper body of the user may be greater than the spring's tension capability. In this case, the

resistance provided by the torsion spring acting on the head portion **52** of the device **10** will simply assist the user in performing a sit-up. This is done by supplementing the trunk flexor muscles by "removing" a portion of the user's affective upper bodyweight by virtue of tension in the spring.

A second part of the exercise is in the leg\hip extension movement that takes place by pressing the user's **78** feet **80** against the handle **26** of the base **12**. The wheels **28** are supported on the floor **90**, or other supportive surface, as the base **12** extends away from the frame **14**. This movement is illustrated by the forward arrow **92**. The return movement (rear arrow **94**) offers an eccentric action to the extensor muscles of the hips and legs of the user **78**, as well as recoils the device **10** to prepare for another repetition. This eccentric action, concentric resistance and recoil is due to the tension cords **20** which draw the base **12** toward the frame **14**. As previously disclosed, these cords **20** can vary in tension and number of cords to alter the resistance to meet the individual training needs of the user **78**.

The upper body component of this exercise is provided by the bar **38**. The bar handle **44** makes direct contact with the hands **96** of the user **78**. The bar **38** is locked into place by the lock **30**. As force is applied to the bar handle **44** the spring **44** deforms in an inferior direction as depicted by the inferior arrow **98**. The elastic properties of the spring **40** offer resistance to deformation and require the user **78** to resist movement back to an upright or neutral position. This movement is shown by the superior arrow **100**. This provides a concentric and an eccentric action for the arm, chest and shoulder muscles of the user **78**.

It is understood that this is only one example of the use and embodiment of the invention as seen by the inventor. This version is shown in that it is considered by the inventor to be the

preferred embodiment, though many details as disclosed are not intended to be considered limiting.

What is claimed is: